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10/593,990	02/07/2007	Regis Peytavi	CU-5127 BWH	3406

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EXAMINER	
PREGLER, SHARON	
ART UNIT	PAPER NUMBER
1772	

NOTIFICATION DATE	DELIVERY MODE
03/09/2012	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ChicagoUSPTO@ladas.net

Office Action Summary	Application No.	Applicant(s)	
	10/593,990	PEYTAVI, REGIS	
	Examiner	Art Unit	
	SHARON PREGLER	1772	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 November 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1,5,7-28,30,31,33,34,37-40,47 and 50-56* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1,5,7-28,30,31,33,34,37-40,47 and 50-56* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *22 July 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The Examiner acknowledges Applicant's response filed on November 10, containing amendments and remarks to the claim.

Claims 1, 5, 7-28, 30-31, 33-34, 37-40, 47, and 50-56 are currently pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 1, 7-14, 20, 21, 23-26, 31, 33, 34, 38, & 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. US Patent 6,878,255 in view of Benn et al. 2005/0277125.

Regarding claim 1, Wang teaches in Figures 1, 4, & 34 and column 14 line 20 – column 15 line 60, a microfluidic flow cell (separation component 120) that comprises an elongate body (see Figures 1 and 34 for elongated body shape) defining front (right in figure 34) and rear ends (left) and opposite lateral sides;

at least one reaction portion (region of channel 130) formed at least near said front end and defining with the substrate (detection portion 140)

at least two fluid-receiving portions (reservoirs 122, 124, & 126) positioned at least near said rear end for receiving a fluid therein and being in fluid communication with said reaction chamber;

a common channel (reaction channel 130) positioned generally centrally of said elongated body and in fluid communication with said reaction chamber;

at least two separate conduits (channels 128; note that channel 128 fluidically intersects channel 130, thus separating channel 128 into at least two conduits) being in fluid communication with said common channel and extending therefrom towards a respective one of said opposite lateral sides, each said conduit being in fluid communication with a respective one of said at least two fluid-receiving portions (See layout of fluidic components in figure 34); and

a dispensing portion (outlet 132) in fluid communication with said reaction area, and with the external environment of said microfluidic flow cell, said dispensing portion comprising a dispensing channel (outlet portion of channels 130 & 132) formed within said microfluidic flow cell;

wherein when in said interfaced position, said microfluidic flow cell is adapted to allow for the fluid in said fluid-receiving portion to flow to said reaction chamber and for excess fluid in said reaction chamber to flow into the external environment via said dispensing portion (embodiments may include reservoirs on removable portion 140).

Wang does not explicitly teach a hydrophilic substrate for removably interfacing with the microfluidic flow cell that allows the reaction product to remain on the substrate after removing the substrate from the microfluidic flow cell.

Benn teaches a device for performing reactions on a substrate which comprises an array 64 (see figures 5-6) that is interfaced with a surface 50, (the substrate is considered as the array 64 and surface 50). Transfer array 84 (microfluidic flow cell) comprises a channel 88 ([0084]) and communicate with the array 64 by inlets 73 ([0186]). When the microfluidic channel is removed, the reactants remain on the reaction surface ([0065]-[0066] & Figure 3 for flow chart of steps). The reaction surface may be hydrophilic ([0110]).

Thus, it would have been obvious to one having ordinary skill in the art to combine the flow cell of Wang with the substrate of Benn because the modification would allow samples and reagents to react in a common channel and be deposited on a substrate for further analysis or detection (Benn [0018]-[0022]).

Regarding claim 7, Wang teaches the reaction area inherently comprises a reaction cavity within channel 130 *(column 7 lines 45-55).*

Regarding claim 8, Wang teaches the channels can be made by etching or grooves on the substrate *(column 7 lines 45-55).*

Regarding claim 9-10, Wang teaches fluid receiving portions 122, 124, and 126, one may be a sample, buffer, or reactant reservoir *(column 15 lines 45-50*).

Regarding claim 11, Wang teaches fluidic receiving portions 122, 124, & 126 that inherently comprises a fluid receiving cavity defining a fluid receiving chamber *(column 15 lines 45-60).*

Regarding claim 12 Wang teaches the microfluidic flow cell with the conduits formed within said microfluidic flow cell *(Figure 34 column 15 lines 30-60).*

Regarding claims 13 & 15, Wang teaches conduits 128 inherently comprising a conduit cavity defining a conduit *(column 15 lines 45-60).* Wang suggests in column 15 lines 40-60 that chambers and outlets are formed when component 120 is interfaced with component 140.

Wang does not explicitly teach defining a conduit cavity when microfluidic flow cell and substrate are in said interfaced position.

Benn teaches a fluid receiving chamber (inlet 72 creates a chamber with surface 50 [0071]) when the flow cell and substrate are interfaced.

Thus, it would have been obvious to one having ordinary skill in the art to combine the flow cell of Wang with the substrate of Benn because the modification would allow samples and reagents to react in a common channel and be deposited on a substrate for further analysis or detection (Benn [0018]-[0022]).

Regarding claim 14 Wang teaches the microfluidic flow cell with one of the plurality of conduits formed within said microfluidic flow cell *(Figure 34, column 15 lines 30-60).*

Regarding claim 20, Wang teaches a plurality of fluid receiving portions in fluid communication with the common channel and reaction area (*Figure 34, column 15 lines 30-60).*

Regarding claim 21 & 25, Wang teaches conduits meeting at the central common channel *(column 15 lines 45-60, figure 34).* Wang suggests that there may be a plurality (more than two) channels or conduits (bores) on the fluidic chip *(column 9 lines 5-20)* or a multiplicity of channels or fluid conduits, such as three or more, meet at a given point, and are thereby in fluid connection one with the other. The intersection forms a cavity well or reservoir.

Wang does not explicitly teach a pair of bores that meet at the central channel formed within the flow cell.

However, Benn teaches receiving ends 98 (at least 5 depicted in Figure 6) that communicate with the central channel 88 ([0159]) and distribute reactants.

Therefore, it would have been obvious to one of ordinary skill in the art to add an extra pair of channels, thus have four channels meeting at the common center channel where one pair is considered as the conduits and the other pair is considered as the bore, for the benefit of adding additional reactants or buffer material to meet at the common central channel ([0159]).

Regarding claim 23, Wang teaches the common channel 130 formed on the flow cell *(Figure 34, column 15 lines 30-60).*

Regarding claim 24, Wang teaches common channel 130 that inherently comprises a common channel cavity defining a common channel *(column 15 lines 45-60).*

Wang does not explicitly teach defining a common channel with a common channel cavity when microfluidic flow cell and substrate are in said interfaced position.

However, Wang suggests in column 15 lines 40-60 that chambers and outlets are formed when component 120 is interfaced with component 140. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate other fluidic components to be formed when the two parts are interfaced in order for fluids to interact and be collected on the respective substrate when separated.

Therefore, Wang suggests to one of ordinary skill in the art to have a channel, chamber, or fluidic conduits formed with two substrates are interfaced together.

Regarding claim 26, Wang teaches bore channels that inherently comprises a bore channel cavity defining a bore channel *(column 15 lines 45-60).*

Wang does not explicitly teach defining a bore channel when microfluidic device and substrate are in said interfaced position.

However, Wang suggests in column 15 lines 40-60 that chambers and outlets are formed when component 120 is interfaced with component 140. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate other fluidic components to be formed when the two parts are interfaced in order for fluids to interact and be collected on the respective substrate when separated.

Therefore, Wang suggests to one of ordinary skill in the art to have a channel, chamber, or fluidic conduits formed with two substrates are interfaced together.

Regarding claim 30, Wang teaches a dispensing channel outlet 132 that inherently comprises dispensing channel outlet cavity defining a dispensing channel outlet *(column 15 lines 45-60).*

Wang does not explicitly teach defining a dispensing channel outlet when microfluidic device and substrate are in said interfaced position.

However, Wang suggests in column 15 lines 40-60 that chambers and outlets are formed when component 120 is interfaced with component 140. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate other fluidic components to be formed when the two parts are interfaced in order for fluids to interact and be collected on the respective substrate when separated.

Therefore, Wang suggests to one of ordinary skill in the art to have a channel, chamber, or fluidic conduits formed with two substrates are interfaced together.

Regarding claims 31, 33, & 34, Wang teaches the planar substrate, or the portion with the channels or conduits, may be constructed of fused-silica, glass, other silica-based substrates, plastics, polymeric materials, elastomeric materials, and the like (*column 8 lines 1-7, PDMS is well known material in microfluidics*). The material may also be hydrophobic (claim 31, column 8 lines 23-25).

Regarding claim 38 Wang teaches the microfluidic device above that may be glass *(column 8 lines 1-7)*.

Regarding claim 47, Wang teaches transporting of fluid may be actuated by centrifugal force *(column 4 lines 1-5)*.

Claims 5, 16-19, 22, 27, 28, & 50-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang and Benn as applied above and in further view Mathies US 2002/0068357.

Regarding claims 5 & 22 Wang teaches the microfluidic device above with conduits forming intersections that act as valves *(column 9 lines 15-30*) which may be a selectable and changeable valve.

Wang does not explicitly teach a valve on the device, plurality of separate conduits meet at a valve for fluid communication therewith, said valve being in fluid communication with said common reaction chamber.

However, Mathies teaches control within the microfluidic capillaries comprising the use of valves. *(See [0028] & [0075])*.

It is within ordinary skill in the art and would have been obvious to place a valve in the conduits, intersections, and/or channels above for the benefit of controlling fluid flow in the microfluidic device.

Regarding claims 16 & 27 Wang teaches the microfluidic device above with conduits forming intersections that act as valves *(column 9 lines 15-30)* on the device.

Regarding claims 17 & 28 Wang does not teach a valve cavity, said valve cavity defining said valve when said microfluidic device and said substrate are in said interfaced position.

However, Mathies teaches control within the microfluidic capillaries comprising the use of valves. *(See [0028] & [0075])*.

It is within ordinary skill in the art and would have been obvious to place a valve in the conduits, intersections, and/or channels above for the benefit of controlling fluid flow in the microfluidic device.

Wang suggests in column 15 lines 40-60 that chambers and outlets are formed when component 120 is interfaced with component 140. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate other fluidic components to be formed when the two parts are interfaced in order for fluids to interact and be collected on the respective substrate when separated.

Therefore, Wang suggests to one of ordinary skill in the art to have a channel, chamber, valves, or fluidic conduits formed with two substrates are interfaced together.

Regarding claim 18, Wang teaches the microfluidic device above with the common channel formed on the microfluidic device (*column 15 lines 40-60*).

Regarding claim 19, Wang teaches common channel 130 that inherently comprises a common channel cavity defining a common channel (column 15 lines 45-60).

Wang does not explicitly teach defining a common channel with a common channel cavity when microfluidic device and substrate are in said interfaced position.

However, Wang suggests in column 15 lines 40-60 that chambers and outlets are formed when component 120 is interfaced with component 140. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate other fluidic components to be formed when the two parts are interfaced in order for fluids to interact and be collected on the respective substrate when separated.

Therefore, Wang suggests to one of ordinary skill in the art to have a channel, chamber, or fluidic conduits formed with two substrates are interfaced together.

Regarding claims 50-56, Wang teaches the microfluidic device above.

Wang does not explicitly teach at least one vent said vent being in fluid communication with the ambient environment or with the respective fluidic channels, bores, conduits, or chambers.

Mathies teaches control within the microfluidic capillaries comprising the use of vents. *(See figure 1, 9 [0019], [0028], [0060] & [0075])* for the benefit of controlling fluid flow through positive and negative pressure *([0060])*.

It is within ordinary skill in the art and would have been obvious to place a vent between the environment and reaction chamber, environment and fluid receiving

portion, environment and conduit, environment and valve, and environment and dispensing portion, above for the benefit of controlling fluid flow in the microfluidic device through positive and negative pressure.

Claims 37, 39, & 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Chen et al. US 2003/0087292.

Regarding claims 37 & 39-40 Wang teaches the support as detection portion 140.

Wang does not explicitly teach a functionalized glass surface (**claim 37**) that's a microarray (**claim 39**) with bioprobe spots (regarding **claim 40**).

Chen teaches an array of probes deposited on a surface of the substrate; and a cover having a channel *(figure 42 shows other embodiments of the channel structure including pluralities of channels)* being coupled to the substrate such that a target fluid flowing through the channel cavity contacts each probe in the array of probes *([0014])* for the benefit of targeting molecules within a small area *([0004]). (See Chen [0004-0005], [0014-0015], [0070-73] Figures 1-2 & 42).*

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the microarray and probe spots with the device of Wang and place the array at the reaction portion or downstream the channel 130 for the benefit of targeting molecules within a small area.

Response to Arguments

Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection as necessitated by amendment.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHARON PREGLER whose telephone number is (571)270-5051. The examiner can normally be reached on Mon - Fri 8am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, In Suk Bullock can be reached on (571)272-5954. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sharon Pregler/
Examiner, Art Unit 1772

/In Suk Bullock/
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